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VAGUS NERVE STIMULATION AND BONE REMODELING

Cholinergic stimulation, using acetylcholinesterase inhibitors, has been found to decrease the fracture risk in animal and human studies. As the vagus nerve carries cholinergic fibers, this study investigated whether epilepsy patients, who receive vagus nerve stimulation (VNS) as a treatment for refractory seizures, would experience an improvement in bone mineral density (BMD).

This pilot, prospective study included patients with refractory seizures who underwent VNS surgery between January of 2012 and December of 2018. Baseline BMD was measured using dual-energy x-ray absorptiometry, and included the lumbar spine and femoral neck, with a second scan performed six to 12 months post-surgery. Subjects were 21 patients with a mean age of 23 years and a mean BMD of 23.6 kg/m².

Following VNS, the mean lumbar BMD increased from 1.00 g/cm^2 to 1.04 g/cm^2 (p=0.001). This finding was significant for both males and females. There was no significant change in BMD in the femoral neck.

Conclusion: This pilot study found that, after vagus nerve stimulator implantation, bone mineral density in the lumbar spine increased by a mean of 4.7%.

Tamimi, A., et al. Could Vagus Nerve Stimulation Influence Bone Remodeling? **J Musculoskelet Neuronal Interact.** 2021; 21(2): 255-262.

EDEMA WITH GABAPENTINOID DRUGS

Gabapentinoids are approved for the treatment of epilepsy and some neuropathic pain disorders. They are widely prescribed as an off-label treatment for low back pain (LBP). As peripheral edema has been noted in up to 16% of users, this study reviewed the incidence of diuretic use among patients with new LBP who were treated with a gabapentinoid.

This Canadian, retrospective, cohort study retrieved data from the publicly funded universal health insurance program in Ontario. From these data were identified residents who were 66 years of age or older with newly diagnosed LBP. The primary outcome variable was a dispensed diuretic within 90 days after the prescription of the gabapentinoid. A secondary analysis was the discontinuation of the gabapentinoid within 180 days after the onset of treatment.

The final cohort of LBP patients included 7,867 new gabapentinoid users and 252,477 non- users. At 90 days, two percent of the gabapentinoid group and 1.3% of the control group were prescribed a diuretic (adjusted hazard ratio = 1.44). By 180 days, the cumulative incidences of diuretic prescription were 3.1% in the gabapentinoid group and 2.4% in the control group. Overall, 47% of the cohort discontinued gabapentinoid treatment within 30 days of the index date.

Conclusion: This study of elderly patients with low back pain found that treatment with a gabapentinoid resulted in a 44% increase in diuretic use, providing further evidence that these medications may contribute to peripheral edema.

Read, S., et al. Evidence of a Gabapentinoid and Diuretic Prescribing Cascade among Older Adults with Lower Back Pain. **J Am Geriatr Soc**. 2021, October; 69(10): 2842-2850.

HEAD PRE-COOLING AND RUN PERFORMANCE

Prolonged exercise in a hot environment may induce early neuromuscular fatigue or a reduction in power output. Pre-cooling strategies have been utilized by athletes to mitigate decrements in exercise performance in the heat. This study evaluated the effect of head precooling on a 5 km time trial involving amateur runners.

Subjects were 15, male, amateur runners with an average age of 22.6 years. After a period of familiarization with the laboratory, the participants undertook one of two experimental trials involving a 5 km running time trial, with the environmental temperature controlled at 35°C. The trials were preceded by either 20 minutes of head cooling, using a hat containing ice (HCOOL), or 20 minutes of rest with no head cooling (control). One week later, each completed a second trial, reversing conditions. The trial performance was compared between conditions.

The average 5 km times were 25 minutes, 36 seconds in the cooling condition and 27 minutes in the control condition (p=0.02). The mean skin temperature, heart rate and rate of perceived exertion did not differ between conditions throughout the exercise. Rectal temperature was reduced during the pre-exercise intervention in the cooling condition but not in the control condition.

Conclusion: This study of amateur runners found that 20 minutes of head cooling before a 5 km race could improve running time.

Coelho, I., et al. Head Precooling Improves 5-Km Time Trial Performance in Male Amateur Runners in the Heat. **Scand J Med Sci Sports.** 2021; 31(9): 1753-1763.

CONCUSSION RECOVERY IN ADHD ATHLETES TAKING STIMULANT THERAPY

Investigators have indicated that youth athletes with attention deficit/hyperactivity disorder (ADHD) are twice as likely to self-report a history of concussion. This study examined the concussion incidence and longitudinal cognitive recovery among a large cohort of youth athletes with ADHD and differing stimulant use.

Subjects were 7,453 student-athletes reporting to concussion centers in Colorado, Florida, 2009 through 2019. All underwent baseline

ImPACT testing at the beginning of the season and received standardized care, including head injury assessment on the field by physicians and athletic trainers, and post-injury ImPACT testing. To track the recovery from symptoms and neurocognitive measures after the injury, ImPACT tests were administered at a median of seven days after injury. Recovery was compared between those athletes with ADHD not taking a stimulant (ADHD-), those with ADHD taking a stimulant (ADHD+), and those not diagnosed with ADHD (control).

Data were completed for 167 ADHD+, 354 ADHD- and 6,932 controls. The incidence of concussion per 100 patient-years was 37.3 in the ADHD+ group, 57 in the ADHD- group and 52.8 in the control group ($p<0.001$ for both groups compared to the ADHD+). Compared with baseline ImPACT scores, the ADHD+ group had a lower deviation from baseline than the ADHD- in verbal memory ($p=0.02$) visual memory ($p=0.005$), and visual motor skills ($p=0.048$).

Conclusion: This retrospective study of 7,453 youth athletes found that stimulant use among those with a diagnosis of ADHD was associated with a reduced incidence of concussions and less severe worsening in ImPACT scores when concussions did occur.

Ali, M., et al. Concussion Incidence and Recovery among Youth Athletes with ADHD Taking Stimulant-Based Therapy. **Ortho J Sports Med.** October 2021. doi:10.1177/23259671211032564l.

CEREBRAL BLOOD FLOW REGULATION AND COGNITION IN SOCCER PLAYERS

Football/soccer players are at an increased risk of neurodegeneration. While most research has focused on structural abnormalities, less attention has been paid to potential impairments in cerebral blood flow (CBF) regulation, to which cerebrovascular reactivity to carbon dioxide (CVR_{CO2}) is a primary determinant. This study was designed to provide insight into the effect of heading on CBF regulation and cognition in male soccer players.

Subjects were male, amateur football players (n=16) and non-contact controls (n=18). Those participants were asked to recall their playing position, experience and heading history. Cerebrovascular function was measured by assessing beat-by-beat, mean arterial blood pressure, blood velocity in the middle cerebral artery, with cerebrovascular conductance and resistance indices.

Cerebral perfusion was measured at rest and in response to both hyper/hypocapnia, in order to determine cerebrovascular reactivity to carbon dioxide. These data were determined using transcranial Doppler ultrasound and capnography, with the sum reflecting the cerebral vasomotor range. Visuomotor coordination was assessed with the Grooved Pegboard Dexterity Test (GPD). Cognition was assessed using the Montreal Cognitive Assessment (MoCA).

No significant difference in basal cerebral perfusion was noted between players and controls. However, cerebral vasomotor range ($p=0.002$), MoCA ($p=0.027$) scores and GPD performance ($p<0.001$) were consistently worse in the players than in the controls. Reduced cerebral vasomotor range was associated with poorer MoCA performance.

Conclusion: This study, comparing male soccer players with matched controls, found that cerebral blood flow regulation and cognition are impaired, even among those with no history of concussion.

Marley, C. et al. Impaired Cerebral Blood Flow Regulation and Cognition in Male Football Players. **Scand J Med Sci Sports.** 2021; Oct. 31 (10):1908-1913.

CEREBRAL PERFUSION AND COGNITION IN JUJITSU ATHLETES

Brazilian jujitsu is a popular martial art that prohibits strikes to the head. However, concerns have been raised regarding the potential link between repetitive neck chokes and accelerated neurodegeneration. This study assessed the cerebral blood flow and cognitive effects of jujitsu practice.

Subjects were 11 male jujitsu athletes and 11 gender-matched controls. Baseline measurements included a physical exam, measures of cardiorespiratory fitness, cardiopulmonary function, combat history, cerebral hemodynamics, and cognitive function.

The jujitsu athletes trained for an average of 12 hours per week over eight years. This activity culminated at, on average, a total of 3,593 neck chokes over the course of their competitive careers, with each ending with syncope or presyncope.

There was no evidence of mild

cognitive impairment in the athletes, with cognitive function comparable between groups (all p > 0.05). No between-group differences were found in arterial diameter, blood velocity, and regional blood flow. However, global cerebral blood flow was significantly elevated in the athletes, as compared with the controls (p=0.037). This resulted from a trend toward increased arterial diameter and blood flow velocity that were common to both the internal carotid (ICA) and vertebral artery (VA) blood flow. No significant differences were seen between groups in learning, memory, working memory, information processing, or visual/motor coordination. There was no evidence of mild cognitive impairment in either group.

Conclusion: This study of elite jujitsu athletes found that, compared to controls, resting cerebral blood flow was elevated in this group, with no evidence of cognitive impairment.

Stacey, B., et al. Elevated Cerebral Perfusion and Preserved Cognition in Elite Brazilian Jujitsu Athletes: Evidence for Neuroprotection. **Scand J Med Sci Sports.** 2021; 31 (11): 2115-2122.

HEART RATE VARIABILITY AFTER CONCUSSION

After a concussive injury, patients often experience physical, cognitive, and emotional symptoms. However, some individuals report neurophysiological and neuropsychological deficits beyond the standard window of recovery. This study assessed whether those with a history of concussion demonstrate heart rate variability profiles different than those of matched controls.

Subjects were hockey players 15 to 18 years of age, all free of prescription medications or neurologic disorders. Those with a history of concussion were compared to those with no concussion history. All participants used continuous electrocardiograph and respiratory monitoring while completing cognitive tasks at rest and while completing cognitive tasks after a bout of submaximal exercise. Outcome measures were the time-domain measures of HRV, mean normalized RR interval (NN), standard deviation of NN interval (SDNN) and root mean square of successive differences (RMSSD), quantified for each assessment.

No between-group differences were noted at rest. During completion of the cognitive tasks at rest, as well as after exercise, the concussed group had greater SDNN ($p<0.05$ for both comparisons) and RMSSD ($p<0.05$ for both comparisons) as compared to controls.

Conclusion: This study of adolescent hockey players found that those with a history of concussion have cardio-autonomic differences as compared to controls.

Harrison, A., et al. Impact of Concussion History on Heart Rate Variability during Bouts of Acute Stress. **J Athl Train.** 2021. Published ahead of print. DOI: 10.4085/1062-6050-0314.21.

LOW-LEVEL LASER THERAPY AND NERVE INJURY REPAIR

After a severe peripheral nerve injury, even after surgical repair, only 25% of patients recover lost functions. Among the interventions designed to optimize the recovery efforts, low-level (power range from 10 to 500 mw) laser therapy (LLT), a form of photobiomodulation, has shown promising results. This literature review was designed to help clarify the efficacy of LLT for peripheral nerve injury.

Seven clinical studies, published over the past 10 years, were reviewed. A review of the literature demonstrated that over 80% of the experimental studies led to an improvement in the functional recovery of nerves in the postoperative period. A range of energy densities and wavelengths were used in these studies. In the human studies, improved sensory conduction speed was noted in the median nerve among patients with carpal tunnel syndrome, and in the ulnar nerve among those with ulnar neuropathy. Animal studies demonstrated evidence that LLT optimizes the regeneration of peripheral axons, improving motor function. The authors note that large-quality controlled studies are still needed.

Conclusion: This literature review describes the clinical studies and some of the basic science studies outlining the success and mechanisms of low-level laser therapy for the regeneration of peripheral nerves after injury.

Muniz, X., et al. Efficacy of Low-Level Laser Therapy in Nerve Injury Repair - A New Era in Therapeutic Agents and Regenerative Treatments. **Neurol Sci**. 2021, October; 42(10): 4029-4043.

NERVE FLOSSING FOR FEMORAL NEUROPATHY

Femoral nerve neuropathy is the most frequent nerve injury among patients with hemophilia. This is thought to be secondary to compression caused by iliopsoas hematomas. Nerve flossing refers to techniques that help to reestablish motion between a nerve and its surrounding soft tissues. This study assessed the efficacy of neurodynamic mobilization, a nerve flossing technique, (NFT) for the treatment of femoral neuropathy among patients with hemophilia.

Subjects were 30 males, 12 to 15 years of age, diagnosed with moderate or severe hemophilia. At baseline, all were assessed with a pain visual analog scale and a nerve conduction test to determine femoral nerve motor conduction velocity. The participants were randomized to an NFT group or a control group. The treatment group received two sessions of neurodynamic NFT, beginning with the slider technique in the early stage, moving to the tensioner technique. The control group underwent conventional intervention, including ultrasound therapy. At the completion of the study, femoral nerve motor conduction velocity (MCV) was repeated.

The MCV improved by 33.78% in the control group and 42.11% in the treatment group (p=0.001). The percentages of pain reduction on the VAS were 39.86% in the control group and 65.1% in the treatment group (p=0.0001).

Conclusion: This randomized, controlled trial of patients with hemophilia found that nerve flossing techniques can significantly improve femoral nerve conduction and reduce pain.

Hamed, S., et al. Effect of Neurodynamics Nerve Flossing on Femoral Neuropathy in Hemophiliac Patients: A Randomized, Controlled Study. **J Musculoskel Neuronal Interactions**. 2021; 21(3): 379-386.

PHOTOBIOMODULATION OF THE BRAIN

Photobiomodulation (PBM) refers to the nonthermal use of visible to near-infrared light to stimulate biological processes. Brain PBM is a promising modality by which light, emitted by lasers or light-emitting diodes, is delivered to the scalp to stimulate neural cells and brain function. This study investigated the

effect of a single stimulation on memory in older adults with mild cognitive impairment (MCI).

The subjects were 22 adults diagnosed with MCI, each with a baseline score of three or less on the Short Memory Questionnaire. The subjects were randomly assigned to receive either real or sham PBM. All participants performed visual memory span tests, followed by 350 seconds of real or sham stimulation. This procedure was immediately followed by a repeat of the visual memory span tests. The PBM involved nine LEDs, with 810 nm continuous wave light at an irradiance of 20 mW/cm^2. Hemodynamic responses during the test were measured using functional, near-infrared spectroscopy.

Total scores on cognitive testing improved by 29.3% in the treatment group and 3.7% in the control group, a finding which failed to reach statistical significance. A significant reduction in the hemodynamic response was found in the experimental group, but not in the control group. This reduction was observed across all 16 channels of the frontal lobe region.

Conclusion: This study of patients with mild cognitive impairment demonstrates that one session of photobiomodulation can improve visual memory and reduce the cognitive effort required to complete tasks.

Chan, A., et al. Photobiomodulation Enhances Memory Processing in Older Adults with Mild Cognitive Impairment: A Functional, Near-Infrared, Spectroscopy Study. **J Altz Dis.** 2021; 83(4): 1471-1480.

TRANSCRANIAL DIRECT CURRENT STIMULATION AND ISCHEMIC NEUROPATHY

For carpal tunnel syndrome, decompressive surgery often results in favorable outcomes. However, some have reported an incomplete resolution of hand numbness. This phenomenon may result from damage to the nerve or may also result from sensitization of the central nervous system and abnormal neuroplasticity. The study assessed whether transcranial direct current stimulation (tDCS) can ameliorate induced sensory disturbances in the hands of healthy people.

Healthy adult subjects underwent two testing sessions. In the first, the right index finger arterial flow was interrupted for 30 minutes using a rubber band at the base of the digit. During each session, objective sensory evaluation was completed by increasing electrical current at a steady rate until the participant perceived sensation through an electrode placed on the finger pad. This was identified as the current perception threshold (CPT). The CPT was measured at baseline and after 15 and 30 minutes of ischemia (T15 and T30, respectively). In the second session, the same procedures were carried out, with 15 minutes of tDCS (with an anode placed over the left M1 area), initiated at T15. The CPT of the little finger was used as a control.

Subjects were 10 males with an average age of 25.5 years. During session one, the CPTs of the index finger were 10.3 μA at baseline, 13 μA at T15 and 14.3 μA at T30. During session two, these measurements were 10.2 μA, 12.3 μA and 10.4 μA, respectively. Compared to baseline, significant improvement in the CPT of the index finger were noted at T15 and T30, while in session two, only T15 differed from baseline.

Conclusion: This study found that ischemic induced sensory changes can be ameliorated through transcranial direct current stimulation.

Sunagawa, T., et al. Transcranial Direct-Current Stimulation Reduces Ischemia-Induced Sensory Disturbance in the Hands of Healthy Subjects. **Muscle Nerve.** 2021, November; 64(5): 606-610.

OSTEOPOROSIS IN IDIOPATHIC INFLAMMATORY MYOPATHY

Idiopathic inflammatory myopathies (IIM) are a group of rare heterogeneous systemic diseases characterized by inflammation of skeletal muscles. As osteoporosis and fractures are common among patients with other rheumatic diseases, this study investigated the risk of osteoporosis in patients with IIM.

This retrospective study included data from all patients at the Rheumatology Department, Sahlgrenska University Hospital, Gothenburg, Sweden, who were diagnosed with IIM between 2003 and 2018. Data analysis was completed for those with bone mineral density (BMD) studies within two years of diagnosis. The charts were reviewed for demographic and disease-related variables. Bone mineral density (BMD) measurements were made by dual-energy X-ray absorptiometry (DXA). The BMD was compared among three patient groups, categorized according to the time when DXA was performed after the diagnosis: during the first month (group one), two to six months (group two), or seven to 24 months (group three).

Of the 48 patients with IIM, osteoporosis or osteopenia was found in 25% of group one, 53% of group two and 83% of group three (p=0.009). Significant relationships were found between higher BMI and increased BMD in the femur (p=0.001) and in the lumbar spine (p=0.007). A significant inverse relationship was found between disease duration and BMD of the femur (p=0.025) and lumbar spine (p=0.014).

Conclusion: This study demonstrates that osteopenia/ osteoporosis is common among patients with idiopathic inflammatory myopathies.

Hanna, B., et al. Osteopenia/ Osteoporosis Develops in the Early Phase of Disease in Patients with Idiopathic Inflammatory Myopathies. **Scand J Rheum.** 2021, Sept; 50(5): 398-401.

ASSOCIATION BETWEEN PHYSICAL ACTIVITY AND FATIGUE IN OSTEOARTHRITIS OF THE KNEE

Knee osteoarthritis (KOA) is a significant cause of functional loss and physical disability. As many patients with KOA report fatigue, this study explored the relationship between depressive symptoms, physical activity, and fatigue.

The Multicenter Osteoarthritis Study (MOST) included a community-based sample of men and women with or at high risk of KOA. This study used a subset of the MOST data including 484 patients with symptomatic KOA with baseline and two-year follow-up data. The participants' physical activity levels were objectively measured over nine days using an ankle-worn StepWatch Activity Monitor. Depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CES-D). Physical function was measured with a 20-minute walk test at baseline and two-year follow-up. Fatigue was measured on a 10-point Numeric Rating Scale (NRS).

A significant, inverse relationship was found between baseline physical activity and fatigue two years later (p=0.041). This relationship was not mediated by gait speed or depressive symptoms at follow-up. No significant association was found between baseline physical activity and

depressive symptoms at two-year follow-up.

Conclusion: This study found that higher levels of physical activity are related to lower levels of fatigue at two-year follow-up.

Fawole, H., et al. Is the Association between Physical Activity and Fatigue Mediated by Physical Function or Depressive Symptoms in Symptomatic Knee Osteoarthritis? The Multicenter Osteoarthritis Study. **Scand J Rheumatol.** 2021, Oct; 50(5): 372-380.

HIP DISEASE AFTER CORTICOSTEROID INJECTION

Studies have suggested that corticosteroid injections to the hip may hasten joint degeneration. This study was designed to better understand the association between corticosteroid injections at the hip and subsequent hip degeneration.

The study was conducted in two phases. The first was a retrospective, case-control study of adult patients who underwent treatment for rapidly destructive hip degeneration (RDHD). These patients were compared to those who underwent total hip arthroplasty for reasons other than RDHD. The exposure of interest was prior hip intra-articular corticosteroid injection. Injections of 40 mg or less of corticosteroid were designated as low dose, while those of 80 mg or more were designated as high-dose. The second phase of the study involved a retrospective cohort trial of adult patients who received fluoroscopically guided intra-articular corticosteroid injections into the hip. The risk of RDHD was compared to that of those without intra-articular joint injections.

Of the 1,126 corticosteroid injections performed in 688 hips, there were 37 cases of post-injection RDHD, yielding a rate of 5.4%. Compared to those without corticosteroid injections, the odds ratio of developing RDHD was 8.56 ($p<0.0001$). The risk of developing RDHD was low with a single dose of low-dose steroids but was higher following high-dose injections and multiple injections.

Conclusion: This study documents an association between hip corticosteroid injection and rapidly developing hip disease, with a greater risk among those with multiple injections and those with injections of 80 mg or more.

Okike, K., et al. Rapidly Destructive Hip Disease following Intra-Articular Corticosteroid Injection of the Hip. **J Bone Joint Surg Am**. 2021. DOI: 10.2106/JBJS.20.02155.

BARRIERS TO HOME MODIFICATIONS IN THE ELDERLY

Falls are a leading cause of fatal and nonfatal injury among older adults in the United States. Most fatal falls occur in the home, with the home environment recognized as a factor in the risk of falls. As home modifications can reduce the risk of falls, this study identified potential barriers to the scheduling of home modifications.

A list of home repair and construction companies was made within 15 miles of two residential ZIP Codes in an urban midwestern city, one with a high socioeconomic status and one with a low socioeconomic status. The companies were called by researchers, one male and one female, posing as potential customers. The callers asked for the installation of two grab bars in a tiled shower and a single grab bar adjacent to a toilet. The calls were randomized to either low or high socioeconomic status for the first call and the other socioeconomic status for the second call. The businesses were not told that the inquiry was part of a research study to prevent bias responses. The primary outcome variable was a response with an estimate to do the work.

A total of 98 businesses were included in the study. Of these, 56 did not respond to either of the two calls. At least one response was attained 42.8% of the time, with only 18.4% of the contractors noting that they could provide residential grab bar installations. A total of 23 quotes from 15 businesses were obtained, with the median cost quoted at $394.31. The average wait for installation was 23 days.

Conclusion: This study suggests that a barrier for home modifications for older adults is the identification of a contractor willing to complete the project.

Wiseman, J., et al. Barriers to the Initiation of Home Modifications for Older Adults for Fall Prevention. **Geriatr Orthop Surg Rehab.** 2021; 12: 21514593211002161.

GIVING AND RECEIVING SOCIAL SUPPORT VERSUS MORTALITY

Social relationships are widely more robust behavioral predictors of longevity in humans. This study examined levels of giving support relative to receiving support to assess the association with all-cause mortality rates.

A national US sample of 6,325 adults from the National Survey of Midlife Development in the United States (MIDUS) was used. All were administered a social support questionnaire at baseline and then followed for all-cause mortality for 23 years. Both instrumental (unpaid help (e.g., providing assistance to others with transportation or childcare)), and emotional support (expressions of caring (e.g., comforting and listening to others)) were identified, and scored separately. Individuals were stratified roughly into tertiles, corresponding to disproportionate receiving (those who receive support more than they give) balanced support (those who give modestly more than they receive), and disproportionate giving, (those who give many more hours of support than they receive).

Compared with the balanced group, those who disproportionately received or gave instrumental support had an increased risk of mortality (28% and 19% respectively). Compared with the balanced group, those who disproportionately received or gave emotional support had an increased risk of mortality (14% and 16 % respectively).

Conclusion: This study suggests that individuals who have a balance between accepting support and giving support have reduced mortality compared to those who either excessively give, or excessively receive support.

Chen, E., et al. The Balance of Giving Versus Receiving Social Support and All-Cause Mortality in a US National Sample. **Proc Natl Acad Sci** U S A, 2021, June; 118 (24). e2024770118.

ISCHEMIC STROKE ON ANTICOAGULATION WITH ACUTE CARDIAC EMBOLIC STROKE

Atrial fibrillation (AF) is associated with an increased risk of ischemic stroke (IS). This study assessed whether patients treated with anticoagulation before an IS are at higher risk of recurrence when compared with anticoagulant naïve patients.

Data were obtained from the Initiation of Anticoagulation (IAC) study, a multicenter, retrospective investigation which pooled ischemic stroke registry data from consecutive patients with acute ischemic stroke in the setting of AF treated at eight

comprehensive stroke centers in the U.S. Baseline data included conventional stroke risk factors, as well as cardiac biomarkers, and all medications, recording pre-stroke intake of antiplatelets, statins, warfarin, and direct anticoagulant medications. Those receiving anticoagulation before stroke (A+) were compared to those who were not (A-).

Data were completed for 1,518 subjects, with an average age of 76 years. Of these, 36% were in the A+ group. An analysis, adjusting for prespecified potential confounders revealed a non-significantly higher risk for recurrent ischemic events among subjects in the A+ group (p=0.058).

Conclusion: This study of patients with atrial fibrillation who experienced an ischemic stroke while taking anticoagulation had a slightly higher risk of recurrent stroke than patients with atrial fibrillation who were placed on anticoagulation after the index stroke.

Yaghi, S., et al. Ischemic Stroke on Anticoagulation Therapy and Early Recurrence in Acute Cardioembolic Stroke: The IAC Study. **J Neurol Neurosurg Psych.** 2021, October; 92(10): 1062-1067.

NUMERICAL ACTIVITIES OF DAILY LIVING – FINANCIAL

Financial capacity is a crucial ability that contributes to independent living. While the Numerical Activities of Daily Living - Financial (NADL-F) has shown good validity for measuring financial capacity, it requires 45 minutes to administer. This study was designed to create a shorter version of the NADL-F.

Data were extracted from the original data set, which was used for the full version validation. These data were gathered from 91 patients with heterogeneous neurologic disorders, including mild cognitive impairment, stroke, and Parkinson's disease, as well as from 120 healthy adults. An item analysis was performed, with the authors selecting the items on the NADL-F with the highest internal consistency.

Using the reduced number of items, a new summed score was calculated. The correlations between the new summed score and the original NADL-F score for that task were determined. The authors then selected the minimum item combination with the highest correlation power. A 10-fold cross-validation was then completed.

A correlation analysis showed a low positive correlation between four NADL-F Short tasks and the MMSE for the healthy group. For the patient group, instead, a low-moderate correlation was found for all the NADL-F Short tasks except one. The resulting NADL-F Short Form required 10 to 15 minutes to administer.

Conclusion: This study describes the validation of a shortened version of the Numerical Activities of Daily Living - Financial, which correlated well with the performance of the longer version.

Toffano, R., et al. Numerical Activities of Daily Living - Financial: A Short Version. **Neurol Sci.** 2021, October; 42(10): 4183 - 4191.

ARTHROSCOPIC ELECTROTHERMAL COLLAGEN SHRINKAGE FOR SCAPHOID LUNATE LIGAMENT TEARS

Scapholunate (SL) insufficiency is the most common cause of carpal instability. This study assessed the long-term outcomes of arthroscopic electrothermal collagen shrinking for the treatment of symptomatic laxity after injury to the SL ligament.

This prospective study included patients diagnosed with SL insufficiency who underwent electrothermal shrinkage of the SL ligament tears, in isolation, or combined with triangular fibrocartilage complex (TFCC) tears. The physical examination of the affected and the contralateral extremity were made before surgery and compared with those taken at the final follow-up visit.

Subjects were 20 adults with TFCC. All presented with ulnar side wrist pain. Standard posteroanterior, lateral, and grip view radiographs of the affected wrist were obtained preoperatively and at the final follow-up visit. Electrothermal shrinkage was performed with a probe at 40 W. Continuous irrigation was used to protect surrounding tissue. Patients were splinted for four weeks after the procedure.

At the final follow-up (mean 50.6 months), a painful Watson scaphoid shift test was found in 15%, point tenderness to pressure in 35%, and ulnar-side point tenderness in 21.4%. Significant improvements were noted in the Modified Mayo Wrist Score ($p<0.05$), as well as in pain at rest and with activity ($p<0.05$ for both) and grip strength ($p<0.05$). Seventy-five percent returned to the same or similar work duties.

Conclusion: This study of patients with scaphoid lunate ligament tears found that an arthroscopic electrothermal shrinkage technique resulted in 80% declaring that they were satisfied or very satisfied with the treatment.

Romero, C., et al. Arthroscopic Electrothermal Collagen Shrinkage for Partial Scapholunate Ligament Tears, Isolated or with Associated Triangular Fibrocartilage Complex Injuries: A Prospective Study. **Musculoskel Surg**. 2021, August; 105(2): 189–194.

PERCUTANEOUS TRANSFORAMINAL DISCECTOMY IN ELITE ATHLETES

Lumbar disc herniation (LDH) is a frequent disorder, occurring more often in athletes than in the general public. For those who fail conservative treatment, percutaneous transforaminal endoscopic discectomy (PTED) has been recently introduced as a minimally invasive surgical option. This study assessed the effects of PTED in a group of athletes with LDH.

Subjects numbered 55 competitive, elite athletes with LDH who had failed conservative intervention. All were assigned to the same high-intensity physical therapy protocol beginning the first postoperative day. Clinical assessments were completed preoperatively and up to 12 months post-surgery. Measures included a visual analog scale for low back pain (VAS-LBP) and the 36-item Short-Form Health Survey (SF-36) to assess health-related quality of life.

At six weeks, all five patients with preoperative motor weakness experienced resolution. Significant pain reduction was noted in the VAS-LBP at six weeks, with all patients returning to their previous levels of sports activity at a mean of 6.7 weeks. The mean pain score was 90/100 preoperatively, falling to 21/100 at six weeks, 11/100 at three months and 5/100 at six to 24 months.

Conclusion: This study of elite athletes with a lumbar disc herniation found that minimally invasive percutaneous transforaminal endoscopic discectomy could result in improved pain and a return to their previous level of sports activity.

Kapetanakis, S., et al. Implementation of Percutaneous Transforaminal Endoscopic Discectomy in Competitive Elite Athletes with Lumbar Disc

Herniation. **Am J Sports Med,** December; 49(12): 3234-3241.

ALEMTUZUMAB FOR MULTIPLE SCLEROSIS

Alemtuzumab is a humanized monoclonal antibody that targets the cell surface antigen CD52. In studies comparing alemtuzumab to interferon β1a, alemtuzumab was found to be effective for patients with relapsing-remitting multiple sclerosis (RRMS). This study was designed to provide real-world evidence concerning the use of alemtuzumab in patients with MS.

This retrospective study collected data from 16 Italian multiple sclerosis centers. Data included gender, level of education and clinical information at the time of treatment onset. All were assessed with the Expanded Disability Status Scale (EDSS) and magnetic resonance imaging (MRI). The primary outcome measure was the annualized relapse rate (ARR), before and after treatment onset. Progression-free survival, the cumulative probability of improvement in disease and activity-free probability were calculated.

Data were included for 322 patients, with an average age of 37.8 years. The ARR was 0.99 before and 0.13 during alemtuzumab treatment ($p<0.001$). Progression-free survival was 95.4% after one year, 89.2% after two years, and 86.1% after three years of treatment. The cumulative probability of improvement was 13.5% at one year and 20.6% at two years. The most common medication reaction was urticaria (21%) followed by headache (15%.)

Conclusion: This study of patients with relapsing-remitting multiple sclerosis found that the monoclonal antibody alemtuzumab can help reduce the relapse rate and disability progression.

Russo, C., et al. A Real-World Study of Alemtuzumab in a Cohort of Italian Patients. **Euro J Neurol.** 2021. Early View: doi.org/10.1111/ene.15121.

COVID VACCINES FOR PATIENTS WITH MULTIPLE SCLEROSIS

Since the onset of the COVID-19 pandemic, the US Food and Drug Administration has approved three vaccines. As the safety of these vaccines in patients with multiple sclerosis (MS) has not been well understood, this study reviewed the effects of the BNT162b2 (Pfizer) vaccine provided for patients with MS.

This single-center, prospective, cohort study distributed anonymous questionnaires to patients with MS. The questionnaire included queries about general demographic and disease-related information, including questions concerning age, gender, use of disease-modifying therapies (DMTs), recent treatment with corticosteroids and associated comorbidities. In addition, the questionnaire queried the subjects specifically regarding the safety profile of the COVID-19 vaccine.

Data were collected for 262 participants, of whom 221 (92.5%) had received two doses. Early adverse events were reported by 136 participants (56.9%). The most common adverse event was pain at the injection site, reported by 111 participants (46.4%). Thirty-six participants (15.1%) reported new or worsening neurological events. The most common neurological events were sensory disturbances (n=21), muscle weakness (n=17), pain (n=13) and gait instability (n=12). Only one patient required corticosteroids to address the new symptoms. The authors note that the overall rate of adverse events reported in this study was lower than that reported in the general population.

Conclusion: This study of patients with multiple sclerosis who receive the BNT162b2 (Pfizer) COVID-18 vaccine found that the safety profile of the BNT162b2 vaccine is similar among these patients to that reported in the general population.

Lotan, I., et al. Safety of The BNT162b2 COVID-19 Vaccine and Multiple Sclerosis (MS): Early Experience from a Tertiary MS Center in Israel. **Euro J Neurol.** 2021, November; 28 (11): 3742-3748.

MEDITERRANEAN DIET AND ATHEROSCLEROSIS IN CORONARY HEART DISEASE

The effectiveness of the Mediterranean diet in reducing cardiovascular risk has been demonstrated in primary prevention studies. Little scientific evidence is available however to determine which dietary pattern is most effective for secondary cardiovascular prevention. This study compared the efficacy of the Mediterranean diet rich in extra virgin olive oil, to that of a diet low in fat and rich and complex carbohydrates.

Subjects were adults 20-75 years of age with established coronary heart disease but without clinical events in the past six months. The subjects were randomized to follow either a Mediterranean diet (35% fat, 22% monounsaturated fatty acids, <50% carbohydrates) or a low-fat diet (28% fat, 12% monounsaturated fatty acids, >55% carbohydrates). Intima-media thickness of both common carotid arteries (IMT-CC) was measured as a surrogate marker of subclinical atherosclerosis and predictor of new myocardial infarction and stroke. Of the patients entered, 809 completed a baseline and follow-up carotid ultrasound study including 377 on the low-fat/high complex carbohydrate diet and 432 on the Mediterranean diet.

Subjects in the Mediterranean diet group had a significantly decreased IMT-CC after both five ($p<0.001$) and seven years ($p<0.001$) compared to baseline. Subjects in the low-fat diet did not experience any change in IMT -CC during the same period.

Conclusion: This study of patients with a history of cardiovascular disease, found that the Mediterranean diet, rich in extra virgin olive oil, could reduce the thickness of carotid intima-media and was superior to a low-fat high complex carbohydrate diet.

Jimenez–Torres, J., et al. Mediterranean Diet Reduces Atherosclerosis Progression in Coronary Heart Disease: An Analysis of the CORDIOPREV Randomized Controlled Trial. **Stroke.** 2021, November; 52(11):3440-3449.

FISH CONSUMPTION AND MORTALITY

Previous studies comparing fish consumption with all-cause, cardiovascular disease or stroke mortality have produced inconsistent results. This longitudinal study was designed to clarify the association of fish consumption with all-cause, cardiovascular and stroke mortality in a Chinese population.

The Guangzhou Biobank Cohort Study (GBCS) recruited subjects from the Guangzhou Health and Happiness Association for Respectable Elders (GHHARE) a community social and welfare organization. Subjects underwent a baseline face-to-face interview to collect information on demographic characteristics, lifestyle, family, and personal medical history. The exposure variable was fish intake assessed using a validated food frequency questionnaire including 37 types of fish. The subjects were followed for vital status from March 2008 to December 2017.

(Continued from page 2)

Of the 18,215 participants, 2,697 deaths occurred, including 917 from cardiovascular disease, 374 from stroke and 166 from other cerebrovascular diseases. An analysis was completed with adjustments for known cardiovascular and cerebrovascular risk factors as well as daily energy, vegetable, daily fruit, milk, and nut intake. Compared to those who consumed 0-3 servings of fish per week, those who consumed 4-6 servings had a reduced risk of all-cause mortality (hazard ratio [HR] 0.85), cardiovascular disease mortality (HR 0.77), ischemic heart disease mortality (HR 0.80), and stroke mortality (HR 0.75).

Conclusion: This population based prospective cohort study of the middle age and older adults in South China found that, compared with low consumption, four to six servings per week of fish resulted in a lower risk of all-cause mortality.

Shao, M., et al. Association of For Consumption Risk of All-Cause and Cardiovascular Disease Mortality: An 11-Year Follow-Up of the Guangzhou Biobank Cohort Study. **Eur J Clin Nutr.** 2021, Jul 6. doi: 10.1038/s41430-021-00968-5.

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